HORIZONTAL PARENTING AND GROWTH IN SOCIAL COMPETENCE IN CHILDREN WITH INTELLECTUAL DISABILITIES

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAIʻI AT MĀNOA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

IN

PSYCHOLOGY

MAY 2019

By

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Abstract

Children with intellectual disabilities (ID) often have difficulties with competent social behavior. One way that these children might develop social skills is through reciprocal or "horizontal" interactions with their parents, which, when paired with low rates of "vertical" or directive parenting behaviors, allow the children opportunities to practice competent social behaviors. The current study examined how parents' positive reciprocity and frequency of directives were related to the development of social competence in children (N = 172, ages 6 to 18) with ID. Dependent measures included socially competent interaction behaviors with their parents and broad social competence across settings. Parent-child behaviors were assessed in an observed family interaction task and using a micro-analytic, event-based coding system. Children's broad social competence was assessed using parent and teacher reports of adaptive social behavior at three time points over a 5-year period. It was predicted that parents' high use of horizontal and low use of vertical behavior would be associated with children's greater socially competent behavior with their parents. Moreover, it was hypothesized that parents' high horizontal and low vertical behavior and children's relatively greater socially competent behavior with parents would predict their greater concurrent broad social competence and growth in social competence across time. Multiple linear regression and multi-level modeling analyses were used. The results showed that parents' relatively higher positive reciprocity and relatively fewer directives with their children predicted children's own greater socially competent behavior with them in observed family interaction tasks. Furthermore, although the findings were sparse and limited to demographic subgroups, there was some support that parents' horizontal and vertical behaviors predicted both children's concurrent broad social competence and change in their social competence in the hypothesized directions. The findings suggest that focusing on the quality of parent-child interactions might be a fruitful avenue for interventions aiming to improve social skills for children with ID.

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Introduction

Children with intellectual disabilities face unique challenges compared to their typically developing peers. The diagnosis of intellectual disability indicates that these children characteristically have low to extremely low intellectual ability compared to peers and delayed functioning in several areas of adaptive skills (Emerson & Einfeld, 2011). These children as a group also share multiple other common difficulties. For instance, children with intellectual and other developmental disabilities experience high rates of comorbid psychopathology and higher rates of difficult problem behaviors compared to typically developing children (Dekker & Koot, 2003; Einfeld & Tonge, 1996; Emerson & Einfeld, 2011).

One of the biggest challenges for children with intellectual and developmental disabilities is to develop positive relationships with peers. These children frequently have trouble with various aspects of socially competent behavior, including entering groups of peers, gaining positive responses from peers, sustaining non-solitary play, and handling peer conflict (Guralnick et al., 1998; Guralnick, 2006; Guralnick & Groom, 1987). For example, between the 3rd to 6th grades, these children are on average more avoidant, less cooperative, and less able to self-direct and assert themselves in social interactions with peers than are typically developing children of the same age (Taylor, Asher, & Williams, 1987). Consistent with these observations, children with intellectual and developmental disabilities generally are rated by parents as having fewer social skills than typically developing children (Baker, Fenning, Crnic, Baker, & Blacher, 2007). Due in part to these social deficits, children with intellectual and developmental disabilities usually have significantly fewer friendships and are more socially isolated than typically developing children (e.g., Guralnick, 1997; Guralnick, Gottman, & Hammond, 1996; Guralnick, Neville, Hammond, & Connor, 2007b). The children themselves generally report more dissatisfaction with and anxiety regarding their peer relationships, greater levels of loneliness, and greater social isolation compared to their typically developing peers (Taylor et al., 1987; Williams & Asher, 1992). Such persistent social isolation might contribute to the development of later behavioral and emotional adjustment difficulties in children with intellectual and developmental disabilities (Guralnick, 2006).

Several interventions for improving social skills in children with intellectual and developmental disabilities have been examined, but with little success (Guralnick, 1999a). Some of these interventions target the development of social skills directly within peer interactions by having children with disabilities

interact with typically developing peers in play groups (e.g., McConnell, McEvoy, & Odom, 1992; Odom, McConnell, & Chandler, 1993). In the past, these interventions have been only minimally successful, perhaps because of their low intensity. However, even high intensity interventions have had limited success in improving social skills for children with intellectual and developmental disabilities. For example, Guralnick, Connor, Neville, and Hammond (2006) implemented an intensive intervention for pre-school and kindergarten children with developmental delays. In their intervention, psychologists consulted with teachers and mothers of the children to help develop individualized social development goals and plans for children with developmental delays over a two-year period. Mothers and teachers were coached on how to help structure their children's play with other peers and how to provide appropriate direction to the children during peer interactions to facilitate play. They provided this guidance to their children within actual peer play situations. The effect of the intervention was determined by analyzing children's behavior with their peers pre- and post-intervention, including children's positive and negative behavior toward and in response to peers as well as the proportion of solitary, parallel, and group play. Despite the comprehensiveness of the intervention, children in the intervention group only showed minor improvements on positive behaviors toward peers, though children in the control group showed significant increases in negative behaviors and decreases in responsiveness to peers positive bids across the intervention period. The findings from this study suggest that the intervention might have prevented deterioration in children's competent social behavior. However, the intervention did not substantially improve the social interaction skills of the intervention group overall.

In light of such minimally effective interventions, Guralnick (1999a) has proposed that social skills in children with intellectual and developmental disabilities might be more successfully developed within parent-child interactions than directly within peer interactions (Guralnick, 1999a). However, before interventions are designed based on this premise, it must be established that children with intellectual and developmental disabilities learn socially competent behavior in interactions with their parents. Research with typically developing children suggests that various family factors are related to children's peer competence, including both direct influences through parents' management of their children's activities or explicit social instruction and indirect influences through the quality of parent-child interactions (Cohn, Patterson, & Christopoulos, 1991; Ladd & Pettit, 2002; Parke, Burks, Carson, Neville, & Boyum, 1994).

Thus, it might be useful to examine how social skills develop for children with intellectual and developmental disabilities within parent-child interactions.

Some researchers argue that parents can support the development of socially skilled behavior in their children by interacting with them in a symmetrical or "horizontal" way (Guralnick, Neville, Connor, & Hammond, 2003; Russel, Pettit, & Mize, 1998). Horizontal interactions are characterized by reciprocity in responding as well as by shared power between the individuals. Parents' horizontal interactions with their children are reciprocal and egalitarian, hence closely resembling peer interactions. Thus, when parents behave with their child in a horizontal way, children might learn how to interact in other symmetrical relationships, such as with peers. That is, parents who behave horizontally with their children might provide their children with opportunities to practice effective social behaviors, such as cooperative skills, assertiveness, and reciprocal responding, all of which are likely related to initiating and maintaining peer relationships (Lindsey, Mize, & Pettit, 1997; Russell et al., 1998).

Consistent with this theory, many studies with typically developing children have found that the frequent use of horizontal parenting behavior is related to the development of socially skilled behavior in children. Responsive and reciprocally positive parent-child interactions are associated with higher levels of competent social behavior and positive peer relations in young children (Dumas & LaFreniere, 1993; Lindsey et al., 1997; Mize & Pettit, 1997). Regarding positive reciprocal interactions, Clark and Ladd (2000) found that greater connectedness, including warmth and reciprocity, between parents and 5-year-old children was related to higher teacher ratings of the children's prosocial behavior towards peers, as well as greater peer acceptance, number of mutual friends, and friendship quality. Harrist, Pettit, Dodge, and Bates (1994) found that parent-child positive synchrony, or connected reciprocal positive exchanges between parents and their 5-year-old children, was related to positive social skills in children as rated by their teachers. These authors concluded that perhaps through parents' reciprocal positive interactions, children learn how to respond contingently to others and how to aptly pace interactions.

In contrast to horizontal parenting behaviors, "vertical" parenting behaviors might negatively affect the development of social skills in children. In vertical interactions and relationships, one individual holds more power and influence over the other. When parents give commands to their children or attempt to control their children's behaviors, they are behaving in a vertical manner. Parents might limit their child's

ability to learn effective peer skills within the parent-child relationship when they behave excessively vertically or in highly controlling ways with their child, as doing so limits their child's ability to practice self-directed, socially competent behavior within the parent-child context (Russel et al., 1998).

Consistent with this reasoning, research with typically developing children has found that controlling parenting behaviors are negatively related to children's social competence. Mothers and fathers who displayed relatively low levels of controlling behavior in interactions with their 7 to 9-year-old children had children who were more prosocial with and more likely to be popular among their peers (Attili, Vermigili, & Roazzi, 2010). Furthermore, McDowell and Parke (2005) examined the relationship between parenting behavior and children's social skills. These authors found that parents of 4th grade children who displayed low levels of directive behavior in parent-child interactions had children who were rated by teachers and peers as more socially competent, including more prosocial, more likeable, less aggressive, and less disruptive than children with parents who displayed high levels of control.

Children with intellectual and developmental disabilities might similarly benefit from a horizontal parent-child environment that allows them to practice effective social behavior. Guralnick and colleagues (2007a) focused on mothers who complied frequently to their 4 to 6-year-old children's directives, which the researchers regarded as reflective of a horizontal and symmetrical parenting style. When this behavior occurred frequently, children with developmental delays tended to show greater use of competent directives in their interactions with their mothers. Additionally, the children also displayed more successful social behavior with peers (Guralnick et al., 2007a).

Parents might also foster the development of social skills in their children with intellectual and developmental disabilities by limiting their amount of vertical parenting behavior. When parents displayed low levels of controlling behavior with their 4 to 6-year-old children with developmental delays, these children also achieved higher ratings of peer competence (Guralnick et al., 2003). Moreover, Green, Caplan, and Baker (2014) found that greater frequencies of parental directives that interfered with children's goals were related to lower ratings of adaptive social skills and socially competent behavior as rated by their mothers for 3 to 6-year-old children with developmental disabilities, but not for typically developing children. This finding suggests that the need to practice self-directed, effective social behavior might be especially important for children with intellectual and developmental disabilities.

There are critical features of parent-child interactions involving children with intellectual disabilities that make it especially imperative to examine how parents' directiveness and horizontal behavior are associated with these children's adjustment. Children with intellectual disabilities are frequently less responsive to parents' initiations than are typically developing children (Zirpoli & Bell, 1987). Perhaps because of these children's low responsiveness and their greater need for direction, parents of children with intellectual disabilities display more directive and less positive parenting behaviors than parents of typically developing children (Fenning, Baker, Baker, & Crnic, 2014; Floyd & Phillippe, 1993; Green & Baker, 2011). Unfortunately, a controlling style of interaction, with limited positivity, might contribute to greater severity of behavior problems in children with intellectual delays over time (Fenning, Baker, Baker, & Crnic, 2014). Also, Green et al. (2014) found that parents of children with intellectual disabilities used more interfering directives with their children than parents of typically developing children, and that greater use of these directives among these families was related to lower adaptive functioning in children with intellectual disabilities. Additionally, Norona and Baker (2016) found that mothers of children with developmental disabilities displayed lower levels of appropriate support, enthusiasm, and acceptance of their child's actions in an observed interaction task than did parents of typically developing children, and lower use of these behaviors predicted greater emotional dysregulation in their children. Thus, the relatively low levels of horizontal and positive behavior and greater use of vertical controlling behaviors that parents of children with intellectual disability display might negatively affect their children's behavioral and emotional adjustment.

It should be noted that some investigators argue that the relatively greater use of parental control in these families reflects an adjustment to these children's needs, and is not necessarily harmful for family functioning or the child's development. For instance, although parents of children with intellectual disabilities used more directive techniques in response to their children's need for support, they did not engage in more negative behaviors than parents of typically developing children (Floyd, Harter, Costigan, 2004; Guralnick, Neville, Hammond, & Connor, 2008). Floyd and Phillippe (1993) found that parents of children with intellectual disabilities used relatively more appropriate than inappropriate directives, including more clear and follow-up commands, than parents of typically developing children. This finding suggests that these parents might be especially skilled at managing their children's behavior.

Nevertheless, the need for the parents to be directive fosters a vertical role for them in relation to the child, and it is not clear whether this situation places limits on the child's initiative and opportunities to practice independent social behavior, which has not been examined in previous research. Thus, it is important to understand how parents' behaviors might affect the development of children with intellectual and developmental disabilities considering the potentially low levels of horizontality in parent-child relationships in this population compared to typically developing samples.

Parent and Child Gender Differences

In addition to examining the unique parent-child interactions for these families, it is also important to explore possible mother-father differences. Notably, research with typically developing children indicates that parenting behavior might vary between mothers and fathers due to differing parental roles. Some researchers argue that mothers typically are more involved in instruction and management of their children's behavior, whereas fathers are more likely to serve as a playmate with their child (Carson & Parke, 1996; Parke, 1995; Stoneman & Brody, 1987). However, other research indicates that parenting behavior is very similar between mothers and fathers (Maurer & Sherrod, 1987; McConachie & Mitchell, 1985; Stoneman, Brody, & Abbott, 1983). Moreover, in a study examining families with children with intellectual disability, Floyd and colleagues (1997) found that mothers and fathers showed very similar patterns of behavior with their 6 to 18-year-old children across a 2-year period. Additionally, Fenning and colleagues (2014) found that mothers' and fathers' behaviors with their children with intellectual delays were comparable, with both mothers and fathers showing lower levels of positive behavior and larger increases in negative-controlling behavior across a one-year period than parents of typically developing children. Thus, parents of children with intellectual disability, at least when interacting together in the same observation, likely show a high degree of similarity in their behaviors and parenting style.

Still, it might be that mothers' and fathers' behaviors serve different functions for children relevant to their different parental roles, with horizontal and vertical behavior by mothers affecting children's development differently than fathers' horizontal and vertical interactions (Floyd & Olsen, 2017). For example, mothers' behaviors in family interaction tasks are thought by some researchers to direct the interaction task for children, whereas fathers' behaviors compared to mothers' may be more reactive to

children's level of functioning (Fenning et al., 2014). In this way, mothers' directives may serve the function of leading the task generally, whereas fathers' directives might more often be specifically in response to behavior problems or lower levels of self-direction in children. However, it is not clear whether mothers' and fathers' horizontal and vertical behaviors are associated with children's social development differently in this population.

It is also possible that parenting behavior may influence the development of social skills in children with intellectual and developmental disabilities differently depending on the child's gender. In typically developing children, researchers have explored how parenting variables and styles might influence boys' and girls' development and adjustment in different ways (Crouter, McHale, & Bartko, 1993). Additionally, there is some research suggesting that parents' behaviors have different impacts on the development of gender-matched children, such that mothers' behaviors might be more influential on girls' social development while fathers' behaviors might be more important for boys' (Pettit, Brown, Mize, & Lindsey, 1998). Pettit and colleagues (1998) argued that perhaps parents more effectively promote socially competent behaviors with gender-matched children given that socially competent behaviors are often gender-specific and the socialization strategies that mothers and fathers use might best support social development for girls and boys respectively. While the literature on parenting and development in children with intellectual disabilities has historically not focused on differences in parenting and child adjustment based on child gender, it is important to explore how parents may behave differently with boys and girls and how parenting may have different influences on boys' and girls' development of social skills in this population.

Developmental Changes in Parent Behavior and Children's Social Skills

In order to understand the impact of parenting behavior on children's social development, it is might also be critical to consider developmental changes in the content and the impact of parent-child interactions. As typically developing children enter late childhood and adolescence, parents often place an increased emphasis on fostering their child's autonomy (McNally, Eisenberg, & Harris, 1991). This emphasis suggests that parents might increase their use of horizontal behaviors and decrease their use of directives as children age. Some evidence suggests this pattern might also hold for parents of children

with intellectual disability. Floyd and colleagues (1997) found that there was a trend for mothers of children with intellectual disability to use fewer directives with older children in cross-sectional analyses. However, mothers of children with intellectual disability also displayed the highest rates of positive reciprocity, usually seen as a horizontal behavior, with the youngest children. Rather than horizontality, per se, lower rates of positive reciprocity with older children might reflect a general decrease in play behavior with children as they age (McNally et al., 1991). More research is needed to understand how the frequency of parents' horizontal behavior with their children with intellectual disabilities changes as children mature.

As they mature, children with developmental and intellectual disabilities generally show gains in adaptive behavior and social skills. In a longitudinal study, Hauser-Cram and colleagues (2001) charted these gains across time from infancy up to 10 years of age. Sigafoos, Roberts-Pennell, and Graves (1999) studied the trajectory of adaptive behavior in 3 to 4-year-olds with developmental disabilities across a 3-year period, and adaptive behavior in these children consistently improved. Sloper and Tuner (1996) also found that gains in adaptive behavior for children with Down Syndrome continue into late childhood and adolescence. Accordingly, age-graded standards are used to interpret measures of adaptive behavior in children with developmental and intellectual disabilities in order to account for the expected increases in skills with age (Nihira, Leland, & Lambert, 1993; Lambert, Nihira, & Leland, 1993; Lyman, 2007).

However, some research suggests that there are notable inter-individual differences in the trajectory of socially competent behavior. Guralnick and colleagues (2007b) found that in their overall sample, 4 to 6-year-old children with developmental delays showed gains in socially competent behaviors in interactions with their friends over a 2-year period. However, only children who initially scored very low on these peer interaction measures showed improvements over time. Moreover, a third of the children who initially scored low on peer interaction skills did not show any improvements, and half of the children who initially scored high on the measure of competent peer interactions showed declines in socially skilled behavior. Although Guralnick and colleagues (2007b) focused on the development of social behavior in preschoolers with developmental delays, other research with older children also suggests that there might be variation in whether children with intellectual and developmental delays show stability,

improvements, or declines in adaptive behavior over time (Dykens, Hodapp, & Evans, 1994). Thus, it is important to assess the trajectory of social skills in children with intellectual disabilities, and to identify factors that relate to higher levels of or growth in socially competent behavior.

Additionally, social competence might be a more relevant outcome measure for older children with intellectual disabilities compared to younger children. In typically developing children, the proportion of children's social interactions involving peers increases beginning in middle childhood and continuing into adolescence, and these interactions become increasingly less closely monitored by parents (Rubin, Bukowski, & Parker, 1998). It might be important for research to examine how parents' horizontal and vertical behaviors are related to social skills in older children for whom peer social interactions may be more frequent and salient.

Moreover, it might be that the association between parent's horizontality and directiveness and children's social competence differs depending on children's age. Most of the research examining parents' behavior and competent social skills in children with intellectual disability has studied only young children, from pre-school to early elementary school ages (Guralnick et al., 2007a; Green, Caplan, & Baker, 2014). It is unclear if horizontal and vertical parenting behaviors might be more relevant for the development of socially competent behavior in younger or older children with intellectual disabilities. In order to examine this question, it will be important for research to include a wide age range of children in their investigations and examine parents' horizontal and vertical behaviors with these children across time.

The Current Study

The purpose of this investigation was to test whether parenting behaviors that have been shown to promote the development of social skills for young children with and without intellectual disability had similar consequences for school-age and adolescent children with intellectual disability, for whom peer interactions might be especially relevant. Specifically, the current study examined how parents' horizontal and vertical behaviors were related to the development of social skills in 6 to 18-year-old children with intellectual disabilities, including their socially competent behavior with their parents and their general levels of social competence across settings. Children's general social competence was assessed using

parent and teacher reports of adaptive social behavior on the socialization domain of the American Association on Mental Retardation Adaptive Behavior Scale (ABS; Nihira, Leland, & Lambert, 1993; Lambert, Nihira, & Leland, 1993) at three separate time points: Time 1, Time 2 (18 to 24 months after Time 1) and Time 3 (5 years after Time 1). Parent's horizontal behavior, indicated by their reciprocal positive exchanges or positive reciprocity with their children, and vertical behavior, indicated by their directives to their children, as well as children's competent social behavior, or their positive reciprocity with their parents, was assessed in observed family interaction tasks and using a micro-analytic, event-based coding system at Time 1. A multilevel modeling approach was used to examine the relationship between parents' horizontal as well as vertical behavior and children's socially competent behavior with the family and general social competence over time.

The present study expanded on both previous research with the same sample, and other longitudinal studies of children with intellectual disability. Due to the large age range used in this study, potential differences or similarities in the impact of parents' horizontal behavior depending on child age could be explored. Child and parent interactions were measured naturalistically in families' homes, making these interactions likely representative of their everyday behaviors. Additionally, the innovations included having three time points of measurement of general social competence in children with intellectual disabilities, and examining slopes of change in this construct. Also, previous studies have not measured parent or child behavior concurrently with measures of children's social skills (Green, Caplan, Baker 2014; Norona & Baker, 2016). In previous research with this same population, Floyd et al. (1997) measured parent and child behavior within the same family interactions, but did not use these behaviors to predict children's general social competence. Furthermore, within the current study, differences between mothers and fathers in the display and consequences of horizontal and vertical behavior as well as differences in the development of social skills between boys and girls were explored.

Based on previous research examining parents' horizontal and vertical behavior and the development of social competence in children with intellectual disabilities, it was predicted that:

1. In the context of parent-child interactions, the parents' use of horizontal as opposed to vertical behaviors toward their child would be associated with the child's use of socially competent behaviors toward the parents. Thus, it was predicted that, at Time 1, relatively higher levels of positive

reciprocity and lower frequencies of directives by parents would be associated with higher levels of positive reciprocity by the child, controlling for child age.

2. Both parent horizontal behaviors, including limited use of vertical behaviors, and child socially competent behaviors during family interactions would be associated with higher levels of general social competence for the child. Thus, it was predicted that, at Time 1, relatively higher levels of positive reciprocity and lower frequencies of directives by parents and higher levels of positive reciprocity by children would be associated with children's higher socialization domain scores, controlling for child age.
3. For the sample as a whole, children's general social competence would increase across time, as they mature. Thus, the socialization domain scores of the ABS would show a positive slope for the sample as a whole between Times 1, 2, and 3.
4. There would be significant individual differences in children's social competence trajectories, and both parent horizontal behaviors and child socially competent behaviors during family interactions would be associated with greater growth in children's general social competence over time. Thus, it was predicted that relatively higher levels of positive reciprocity and lower frequencies of directives by parents at Time 1 and higher levels of positive reciprocity by children at Time 1 would be associated with larger positive rates of change in socialization domain scores across Time 1, Time 2, and Time 3, controlling for child age.

Additionally, exploratory analyses were run examine possible influences of child age, child gender, and parent gender on all hypothesized effects.

Methods

Participants

The current study used previously collected data from a longitudinal study of family interactions and outcomes in families raising children with intellectual disabilities (Floyd et al., 1997; Floyd & Phillippe, 1993). Participants were 172 families with a child with an intellectual disability, initially recruited when the children were between the ages of 6 to 18 years old. Participants were recruited through mailings and announcements to families living in a Midwestern state whose children were enrolled in special education

classes at the time of the first wave. Children in the study had either mild (n = 115) or moderate (n = 57) intellectual disability. The children's placement in special education classes from which the sample was drawn required that they obtained IQ scores between 45-70 on either the Wechsler Intelligence Scale for Children-Revised (Wechsler, 1974) or the Stanford-Binet Intelligence Scale (Thorndike, Hagen, & Sattler, 1986). They also needed to show impairment in aspects of their adaptive functioning as measured by teacher reports of the American Association on Mental Retardation Adaptive Behavior Scale, School Version (AAMR ABS; Lambert et al., 1993). Reports of school assessments and Individualized Educational Programs (IEPs) for the children in the study were obtained to confirm their diagnoses.

In total, 171 mothers' and 147 fathers' data could be analyzed. Approximately 70 percent of the families at the first time-point were composed of both parents, married or living together (n= 119). On average, 1.59 (SD = 1.23) children lived in the home for these families. The average age of mothers at Time 1 was 36.57 years (SD = 7.05) and the average age of fathers at Time 1 was 39.22 (SD= 7.45) for fathers. Most participating mothers and fathers were white (82.84 percent of mothers, 95.16 percent of fathers), with a small number of African American (13.01 percent of mothers, 2.42 percent of fathers), Hispanic (1.78 percent of mothers, 1.61 percent of fathers), and Other (2.37 percent of mothers, less than 1 percent of fathers) identifying parents. The average yearly income for the families ranged across the full range of socioeconomic status for the time, with an average yearly family income of $26,530 (SD = $19,620, range = $4,000 to $132,000). The average Hollingshead score for occupational status was 3.13 for mothers (SD = 2.36) and 4.54 for fathers (SD = 2.72). The average level of education for mothers and fathers was at least some college education. The average age of the children at the first wave of data collection was 137.01 months (SD = 41.35), or 11.42 years, and there were roughly equal numbers of boys and girls (87 boys, 85 girls,).

Procedures

Each of the families participated in three waves of data collection. There was a period of 18 to 24 months between the first and second waves, and there was a period of approximately 3 years between the second and third waves. At Time 1, Time 2, and Time 3, families participated in two in-home assessment sessions about one week apart. The first session involved the parents completing

questionnaire measures assessing children's behavior problems, parenting attitudes, and a variety of other family relations measures not examined in this study. In the week between the first and second sessions, parents completed the ABS measure to be collected at the second session, and teachers were mailed the ABS measure to be returned by mail. The second session involved the family's participation in a semi-structured interaction task for 50 minutes. Only the interaction task from Time 1 was used in the current study. The family interaction sessions were conducted in the families' homes and videotaped.

Families could choose the type of activity in which they participated during the observation period within specific guidelines. They were not allowed to play rule-based games in order to obtain a greater range of behavior, and they could not watch TV or talk on the telephone for this task. Common activities that families chose included making dinner, eating a meal or snack, cleaning up after a meal, baking, working on a puzzle, picking up toys, or coloring. The type of activity was recorded as work, play, reading, eating, watching others engage in an activity, or unspecified, but previous findings indicate that type of activity is minimally related to parental behaviors and individual child factors (Floyd et al., 1997).

Measures

Parent and child behavior

Parents' and children's behaviors during family interactions were measured using The Family Process Code (FPC; Dishion, Gardner, Patterson, Reid, & Thibodeaux, 1983). Experienced research assistants at the Oregon Social Learning Center coded the families' micro-analytic behaviors from videotapes of the family interaction tasks. The FPC is used to capture specific behaviors by individuals interacting with one another in the family context, capturing aspects of behavior management, positivity, aggression, and more. In this study, the 50-minute interaction tasks were split into 10-minute segments, where one family member was the focus, and only behaviors enacted by the focus and directed toward the focus by another family member were coded using the FPC. Mothers were the focus for 1 interval, fathers were the focus for 1 interval, a target sibling was the focus for 1 interval, and the target child was the focus for 2 intervals. In this study, only the parents and target child interactions with each other will be examined.

Using the FPC, actions are recorded continuously so that a new code is recorded each time a discernable new action is performed. The initiator, recipient, and content of the action are recorded, as well as the behavior's emotional valence on a 5-point scale from very negative to very positive. There are 26 content codes in total, and the codes were sorted into categories of interest based primarily on their content. Valence was used to categorize otherwise "neutral" content codes as either positive or negative behaviors. Several variables were created based on the combinations of these codes. The validity of these variables for detecting relevant family behaviors is supported by their successful use in previous research examining family interactions in families with children with intellectual disabilities to indicate meaningful constructs (Floyd & Phillippe, 1993; Floyd, et al., 1997). To address the reliability of the coded variables, twenty percent of the observations were coded by two separate coders for reliability at each time point. For the behavior categories used in this study, an average kappa coefficient of .81 was achieved. Average inter-rater agreement was 86 percent.

Two categories of parent behavior and one category of child behavior were examined in the present investigation:

1. Parent frequency of directives: The relative frequency of parents' commands or requests to their children was calculated to indicate the relative frequency scores for parents' directives. Directives included clear commands ("Please pick up your toys"), clear requests ("Would you take the garbage out?") to the child, in which there is a specific behavior change desired within the immediate future. Directives also included ambiguous commands ("If you want your allowance this week you better shape up"), and ambiguous requests ("Will you help me?") to the child, in which an unspecific behavior change is desired or the behavior change is desired within an unspecified time frame. Mothers' and fathers' relative frequency scores for directives were calculated separately.
2. Parent positive reciprocity: The probability that a parent responded to a child's positive behavior with a positive behavior was calculated and used to indicate the parents' positive reciprocity. Positive behaviors included those coded as positive verbal, positive non-verbal, endearments, affectionate holding, or "neutral" content codes such as physical touching and talking with positive valence. Positive verbal behaviors included verbal expressions of approval and support, positive

non-verbal behaviors were any instances of positive facial expressions or gestures, endearments included expressions of unqualified positive emotion or unqualified approval of another family member, and affectionate holding including extended, warm, non-directive physical contact between two family members. Reciprocity scores were calculated using the Generalized Sequential Querier program (GSEQ), a program designed for analyzing observational interaction data (Bakeman & Quera, 1995). Using GSEQ, the conditional probability of an event relative to the base rate for that event can be calculated. A z-score statistic indicating the probability a parent followed a child positive behavior with their own positive behavior at the next step, correcting for the parent's base rate of positives, was calculated and indicated each parents' positive reciprocity. Mothers' and fathers' positive reciprocity scores were calculated separately.

3. Child positive reciprocity: The probability that each child responded to a parent's positive behavior with a positive behavior was used to indicate the children's positive reciprocity toward each parent. Positive behaviors, as mentioned above, included those coded as positive verbal, positive non-verbal, endearments, affectionate holding, and otherwise "neutral" behaviors with positive valence. Scores were again calculated using GSEQ, and the conditional probability that a child followed a parent positive behavior with a positive behavior was calculated. Conditional probability scores were converted to a z-score statistic that accounted for the base-rates of positive behaviors. This z-score indicated each child's positive reciprocity. Positive reciprocity scores towards mothers and fathers were calculated separately.

General social competence

Parents collectively reported children's socially adaptive behavior on the AAMR Adaptive Behavior Scale Residential and Community (AAMR ABS-RC:2; Nihira, Leland, & Lambert, 1993) and teachers reported using the AAMR Adaptive Behavior Scale School (AAMR ABS-S:2; Lambert et al., 1993). The AAMR ABS-RC:2 and AAMR ABS-S:2 measure various aspects of adaptive behavior in children. Each contains two parts, with Part One of the measure focusing on adaptive behavior categorized into 10 separate domains pertaining to independent functioning, physical development, skills at handling money and purchases, language development, understanding of numbers and time, domestic

skills, vocational or school performance, self-direction, personal responsibility, and socialization. Only the socialization domain score will be used in the current study to indicate general social competence in children with intellectual disability, as it is the most relevant to peer interaction skills. The socialization domain includes items pertaining to cooperation, consideration for others feelings and affairs, awareness of others, amount and quality of social interaction with others, participation in group activities, sharing behavior, and social maturity.

There is evidence to support the reliability and validity of the ABS Part One domains. For both the typically developing and developmentally delayed normative samples, the authors of the ABS-S:2 reported that internal consistency alpha coefficients ranged from .79-.98, test-retest reliability coefficients ranged from .86-.97, and inter-scorer reliability coefficients ranged from .95-.98 across the domains. The domains in Part One of the ABS-S:2 show moderate positive correlations with other measures of adaptive behavior (Lambert, Nihira, & Leland, 1993, as cited in Lyman, 2007). Likewise, the authors report adequate stability for the ABS-RC:2, with internal consistency alpha coefficients ranging from .82-.99, test-retest reliability coefficients ranging from .88-.99, and inter-scorer agreement coefficients from .83-.99 for the subdomains on Part One of the measure. The authors also report adequate validity evidence for the ABS-RC:2 Part One domain scores based on item analysis, associations with different measures of adaptive behavior, and the ability of the measure to discriminate between different groups (Nihira, Leland, & Lambert, 1993, as cited in Hatton et al., 2001).

Analyses

Multiple linear regression

A series of multiple linear regressions were conducted to examine Hypothesis 1, which stated that parents' higher positive reciprocity scores and lower frequencies of directives would be associated with higher child positive reciprocity scores. Children's positive reciprocity scores towards mothers and fathers at Time 1 were regressed on parents' positive reciprocity scores and parents' relative frequency scores for directives at Time 1. Separate regressions were conducted for children's interactions with mothers and with fathers. All continuous predictor variables were centered on the grand mean for the sample.

Prior to running the regressions to analyze Hypothesis 1, several preliminary analyses were conducted to examine whether the predictor and criterion variables were associated with child age at Time 1, child gender, and parent gender. Correlations were calculated between child age and mothers' and fathers' positive reciprocity scores, mothers' and fathers' relative frequency scores for directives, and the children's positive reciprocity scores at Time 1. When child age was significantly related to any of these variables, child age was incorporated as a control variable in the regression analysis examining Hypothesis 1. For child and parent gender, analyses of variance (ANOVAs) were conducted to examine whether parents' and children's behaviors at Time 1 differed between boys and girls, children with mild and moderate ID, and mothers and fathers. Child gender and child disability level were treated as between-subjects factors, and parent gender was treated as the within-subjects factor to control for within-family dependency. When behavioral variables differed between boys and girls or children with mild and moderate ID, child gender or disability level was included as a control variable in the regression analyses.

Additionally, to examine whether the association between parents' positive reciprocity and relative frequency of directives and children's positive reciprocity at Time 1 differed depending on the child's age or gender, the interactions between child age and gender with the other predictors were entered into the regressions.

Multi-level modeling

Multi-level modeling techniques were used to evaluate change over time and predictors of initial levels and change in children's social competence as measured by socialization domain scores. Multi-level modeling addresses the non-independent nature of the data collected on the same children across multiple time points. Two levels were examined, with the three measurement occasions at Level 1 nested within individual children at Level 2. Full information maximum likelihood (FIML) was used in this study so that consecutive models with added regression coefficients could be compared. Additionally, the intra-class correlation (ICC) from the unconditional model (i.e., without predictors) was calculated to identify the proportion of variance at each level in the model (i.e., within children and between children; Heck, Thomas, & Tabata, 2013)

SPSS was used to analyze the two-level longitudinal model. Level 1 included linear time coded as 0 for Time 1, .5 for Time 2, and 1 for Time 3. Level 2 included the parent and child behavioral variables and child demographic characteristics. As in the regression analyses, all continuous predictor variables were centered on the grand mean for the sample. The intercept, centered at Time 1 and thus defined as initial status on the social competence measure, and the slope of children's social competence across measurement occasions served as the criterion variables. The average rate of change in social competence across children over time (i.e., the average slope) was used to examine Hypothesis 3, in which it was predicted that on average children's socialization domain scores would increase over time. To examine Hypothesis 2 and 4, parents' positive reciprocity scores, parents' relative frequency scores for directives, and children's positive reciprocity scores at Time 1 were entered into the model to determine their impact on the intercept and rate of change in children's social competence. First, it was predicted according to Hypothesis 2 that parents' higher positive reciprocity scores, lower frequencies of directives, and children's higher positive reciprocity scores would be related to higher intercept scores, or high initial socialization scores. Second, per Hypothesis 4, it was predicted that parents' higher positive reciprocity scores, lower frequencies of directives, and children's higher positive reciprocity scores would also be associated with greater positive rates of change in socialization domain scores over time. Other factors were also examined in the models, including children's initial age at Time 1, child gender, and child disability level. Also, the interactions between children's initial age, disability level, and gender with the behavioral variables were examined in order to determine whether predictions differed based on these characteristics.

Models were run separately for mothers and fathers. Also, because parent and teacher ratings of children's social adaptive behavior on the AAMR ABS were not consistently reliable (Time 1 $r(df = 145) = .29$, Time 2 $r(df = 81) = .29$, and Time 3 $r(df = 64) = .08$), models were run separately to predict parents' reports of children's social adaptive behavior and teachers' reports of children's social adaptive behavior.

The equations for the multilevel models are as follows, with *t* and *i* representing time and individual, respectively:

Mother Models:

Level-one: $Y_{ti} = \pi_{0i} + \pi_{1i}\mathbf{Time}_{tij} + e_{ti}$

Level-two: $\pi_{0ij} = \beta_{00} + \beta_{01}\mathbf{MotherPosRec}_{1i} + \beta_{02}\mathbf{MotherDirectives}_{2i} + \ldots \beta_{0x}\mathbf{ChildGender}_{xi} + u_{0i}$

$\pi_{1ij} = \beta_{10} + \beta_{11}\mathbf{MotherPosRec}_{1ij} + \beta_{12}\mathbf{MotherDirectives}_{2ij} + \ldots \beta_{1x}\mathbf{ChildGender}_{xi} + u_{1i}$

Father Models:

Level-one: $Y_{ti} = \pi_{0i} + \pi_{1i}\mathbf{Time}_{tij} + e_{ti}$

Level-two: $\pi_{0ij} = \beta_{00} + \beta_{01}\mathbf{FatherPosRec}_{1i} + \beta_{02}\mathbf{FatherDirectives}_{2i} + \ldots \beta_{0x}\mathbf{ChildGender}_{xi} + u_{0i}$

$\pi_{1ij} = \beta_{10} + \beta_{11}\mathbf{FatherPosRec}_{1ij} + \beta_{12}\mathbf{FatherDirectives}_{2ij} + \ldots \beta_{1x}\mathbf{ChildGender}_{xi} + u_{1i}$

Results

Preliminary Analyses

The results of the preliminary correlational analyses are presented in Table 1. Child age at Time 1 was significantly negatively correlated with mothers' frequency scores for directives and positively correlated with both parents' and teachers' socialization domain scores. Thus, child age was entered as a control variable in all regression and MLM analyses.

Table 2 displays the group means for all variables and the results of the preliminary ANOVAs to check for possible confounds.

The ANOVAs with child gender as the between-subjects variable and parent gender as the within-subjects variable revealed two significant effects: a main effect of parent gender on parents' directives ($F = 12.84$, $p<.01$) and a Parent Gender X Child Gender interaction on parents' positive reciprocity scores ($F = 3.90$, $p<.05$). As shown in Table 2, mothers displayed a greater relative frequency of directives than fathers. As for the significant interaction, as shown in Table 2, the parents tended to display the highest levels of positive reciprocity with their gender-matched children (i.e. fathers with boys, mothers with girls). However, only the mothers' positive reciprocity scores with girls vs. boys significantly differed from each other ($t = -2.11$, $p<.05$). ANOVAS with child disability level (mild vs. moderate) as the between-subjects factor and parent gender as the within-subjects factor revealed a significant Parent Gender X Disability Level interaction on child positive reciprocity ($F = 4.530$, $p<.05$). The significant interaction effect indicated that children with moderate ID exhibited especially low levels of positive reciprocity towards their mothers (See Table 2). Specifically, the children with moderate ID had

significantly lower positive reciprocity scores toward their mothers than those with mild ID ($t = -2.03$, $p<.05$), and toward their mothers than toward their fathers ($t = -2.22$, $p<.05$). Thus, based on these results, child gender and disability level were controlled for in all further analyses.

Table 1. Bivariate Correlations Between All Time 1 Variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Mother Positive Reciprocity	--										
2. Father Positive Reciprocity	-.07	--									
3. Mother Directives	.02	-.04	--								
4. Father Directives	-.09	.18	.44**	--							
5. Child Positive Reciprocity (Mother)	.33**	-.17	-.29**	-.22*	--						
6. Child Positive Reciprocity (Father)	.01	.41**	-.07	-.15	-.17	--					
7. Socialization T1 (Parent)	.10	.04	-.14^	-.28**	.09	-.04	--				
8. Socialization T1 (Teacher)	-.12	-.10	-.18*	-.24*	.09	.10	.29**	--			
9. Age	-.07	.09	-.35**	-.17^	-.07	.17^	.22**	.32**	--		
10. Disability Level	.10	-.03	-.03	-.21*	.15^	-.13	.08	.12	-.16*	--	
11. Gender	.12	-.10	-.14^	-.04	.14	-.10	-.03	.03	-.02	-.07	--

Notes. (1) Number of participants for mother variables ranged from 156 to 162 (2) Number of participants for father variables ranged from 98 to 113 (3) Number of participants for demographic variables was 172. **p< 0.01. * p< 0.05 ^ p<.01.

Table 2. Means for Time 1 Behavior Variables by Gender and Disability Level

Variable	Total Sample N=89 M (SD)	Child Gender: Boys N=42 M (SD)	Child Gender: Girls N=47 M (SD)	Disability Level: Mild N=55 M (SD)	Disability Level: Moderate N=34 M (SD)
Parent Positive Reciprocity					
Mothers	.65 (1.23)	.37 (1.14)[a]	.90 (1.27)[b]	.77 (1.13)	.45 (1.37)
Fathers	.72 (1.40)	.83 (1.51)	.61 (1.30)	.73 (1.31)	.68 (1.56)
Parent Directives					
Mothers	7.09 (4.16)	7.23 (4.48)	6.97 (3.90)	7.17 (4.14)	6.96 (4.27)
Fathers	5.35 (4.11)	5.54 (3.56)	5.18 (4.58)	4.71 (3.67)	6.38 (4.61)
Child Positive Reciprocity					
Mothers	.37 (1.32)	.18 (1.11)	.55 (1.47)	.58 (1.46)[a]	.05 (.97)[b]
Fathers	.47 (1.22)	.54 (1.27)	.41 (1.19)	.33 (1.21)	.70 (1.23)

Notes. (1) M (SD) = Mean (Standard Deviation). (2) Number of participants (N) is included in superscript. (3) Mean values in rows with different superscripts differ ($p<.05$) based on individual between-subjects t-test

Linear Regressions

The linear regression analyses tested Hypothesis 1, which proposed that relatively high levels of positive reciprocity and low relative frequencies of directives by parents at Time 1 would predict high levels of positive reciprocity by the child. These regressions included child age at Time 1, child disability level (i.e. mild or moderate ID), and child gender as control variables entered at step 1, and parent behavioral predictors (i.e. mothers' or fathers' positive reciprocity and relative frequency scores for directives) entered at step 2. Interaction terms between child demographic characteristics and parent behavioral predictors were entered at step 3 using step-wise regression analyses, and only the significant interaction effects that entered the models were retained.

Tables 3 and 4 present the results of the regression analyses. Both mothers' and fathers' positive reciprocity scores and relative frequency scores for directives predicted child positive reciprocity scores in the expected directions. Thus, relatively higher levels of positive reciprocity and lower frequencies of directives by both mothers and fathers were associated with higher child positive reciprocity, supporting Hypothesis 1. There were also three significant interactions; between child gender and mothers' relative frequency scores for directives, child gender and fathers' positive reciprocity scores, and child age and fathers' relative frequency scores for directives. Figure 1 shows that mothers' relative frequency of directives, centered and expressed as a percentage, had a much stronger impact on the girls' positive reciprocity scores than on the boys' scores. The simple effects of the slopes in Figure 1 indicate that the effect of mothers' relative frequency of directives on child positive reciprocity was significant for girls, B(SE) = -.15(.04), β = -.38, p<.01, but not for boys, B(SE) = -.04(.03), β = -.16, p= .142. Figure 2 illustrates that fathers' relative frequency of directives, centered and expressed as a percentage, had a much stronger negative relationship to older children's positive reciprocity scores than for children in the middle and youngest age ranges. Simple slope analyses indicated that the effect of fathers' relative frequency of directives was significant for older children, B(SE) = -.11(.04), β = -.35, p<.01, only trending towards significance for children in the middle age range, B(SE) = -.06(.03), β = -.17, p =.06, and not significant for relatively younger children, B(SE) = .01(.04), β = .02, p = .87. Figure 3 shows that fathers' positive reciprocity scores had a much stronger positive association with boys' positive reciprocity scores than with girls'. The simple effects of the slopes in Figure 3 indicate that the association between fathers'

positive reciprocity and child positive reciprocity is significant only for boys, B(SE) = .59(.11), β = .65, p<.01, not for girls B(SE) = .20(.13), β = .21, p=.14. Thus, although all main effect predictors were significant and in the direction consistent with Hypothesis 1, these interactions indicate that three of the four significant effects could be accounted for by subsections of the sample. Nonetheless, within each subgroup the significant effects were consistent with the hypothesis that greater parent reciprocity and less directiveness would be associated with greater child competence in the form of positive reciprocity toward the parents.

Table 3. Regression of Child Positive Reciprocity (Toward Mothers) on Mothers' Behaviors and Demographic Variables (N = 156)

	Model 1		Model 2		Model 3	
Variable	B (SE)	*β*	B (SE)	*β*	B (SE)	*β*
Age	0.00 (.00)	-.04	-0.01 (.00)	-.14	-0.01 (.00)	-.14
Disability Level	0.43 (.23)	.15	0.26 (.21)	.09	0.23 (.21)	.08
Gender	0.40 (.22)	.15	0.17 (.20)	.06	0.16 (.20)	.06
Mother Positive Reciprocity			0.26 (.07)	.28**	0.26 (.07)	.29**
Mother Directives			-0.10 (.03)	-.31**	-0.06 (.03)	-.19*
Gender * Mother Directives					-0.10 (.05)	-.19*

Notes. (1) Only demographic variables were included in Model 1 and mothers' behavior variables were added in Model 2, (2) Interaction terms were entered in a stepwise fashion; Model 3 includes all interaction terms which were significant and entered the model. *p<0.05; **p < 0.001

Table 4. Regression of Child Positive Reciprocity (Toward Fathers) on Demographic Variables and Fathers Behaviors (N=97)

	Model 1		Model 2		Model 3	
Variable	B (SE)	*β*	B (SE)	*β*	B (SE)	*β*
Age	0.01 (.00)	.15	0.01 (.00)	.15	0.01 (.00)	.18*
Disability Level	-0.33 (.30)	-.11	-0.44 (.27)	-.15	-0.31 (.26)	-.11
Gender	0.30 (.28)	-.11	-0.21 (.25)	-.08	-0.21 (.24)	-.08
Father Positive Reciprocity			0.42 (.09)	.46**	0.61 (.11)	.66**
Father Directives			-0.08 (.03)	-.25*	-0.06 (.03)	-.18
Gender * Father Pos. Rec.					-0.39 (.16)	-.28*
Age * Father Directives					0.00 (.00)	-.21*

Notes. (1) Demographic variables only were included in Model 1 and fathers' behavior variables were added in Model 2, (2) Interaction terms were entered in a stepwise fashion and Model 3 includes all interaction terms which were significant and entered the model. * $p<0.05$; ** $p < 0.001$

Figure 1. Summary of Interaction Between Gender and Mother Directives Predicting Child Positive Reciprocity

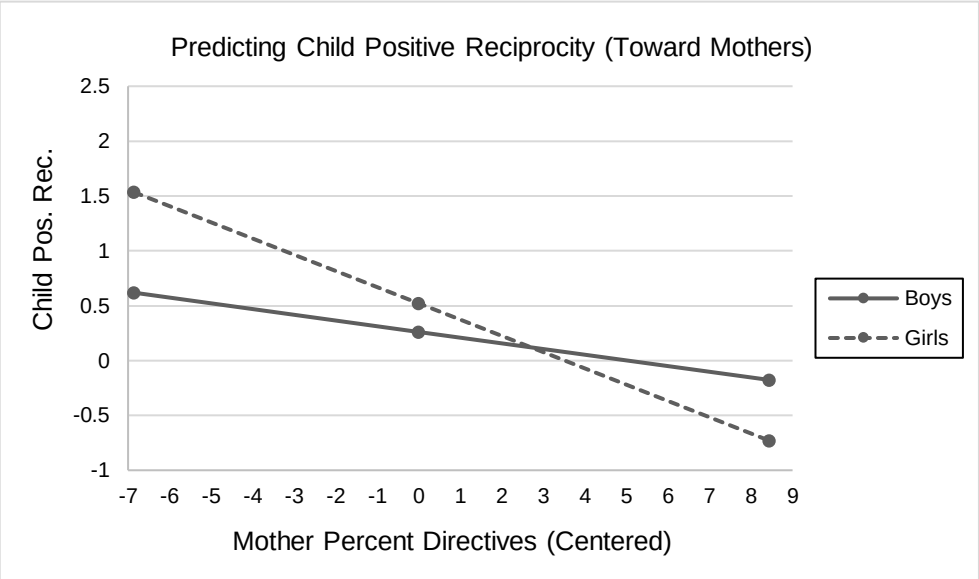


Figure 2. Summary of Interaction Between Age and Father Directives Predicting Child Positive Reciprocity

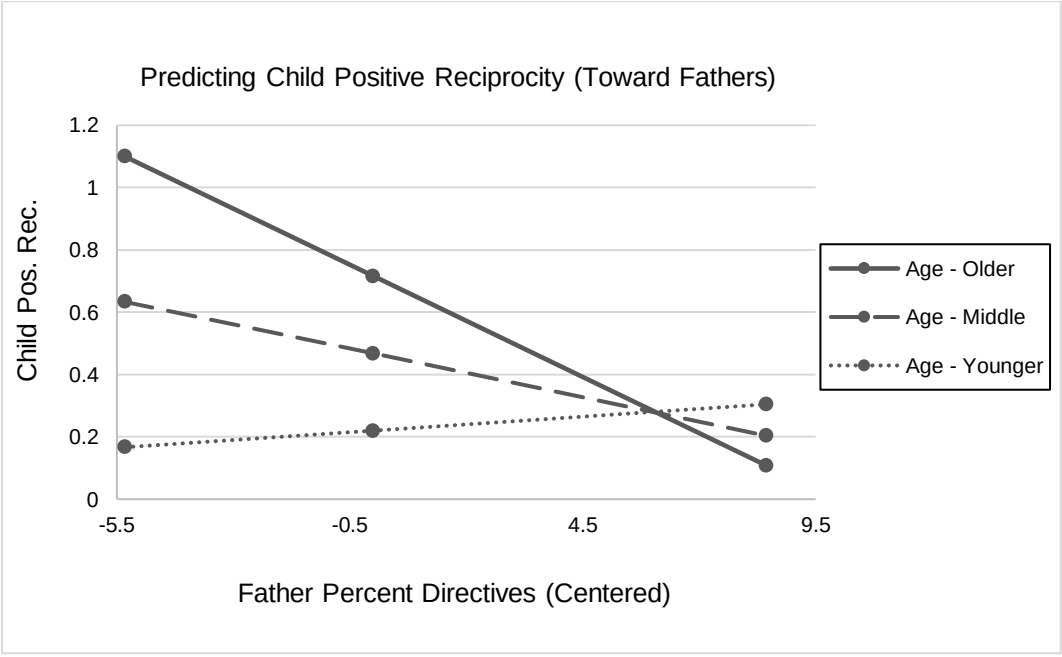
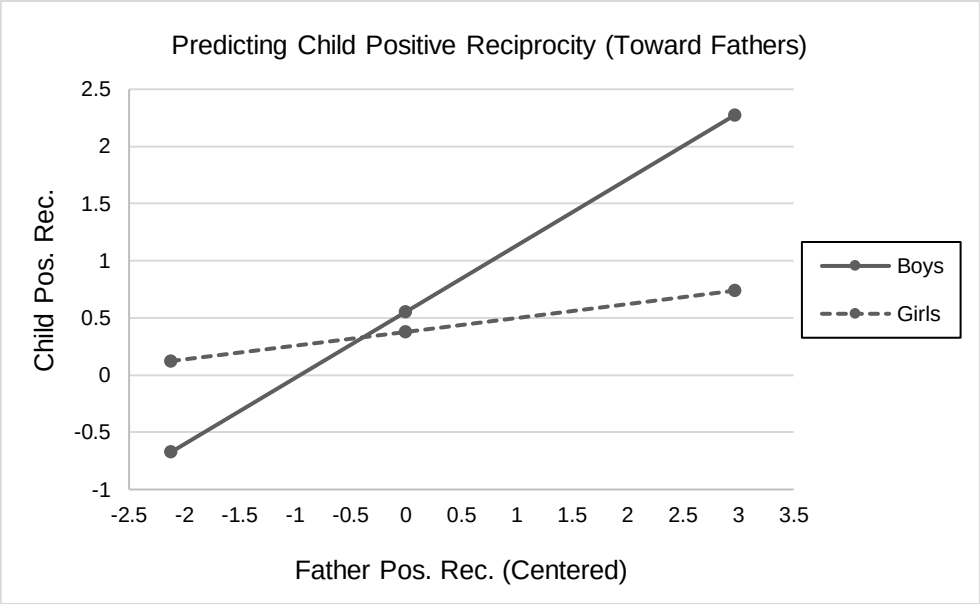


Figure 3. Summary of Interaction Between Gender and Father Positive Reciprocity Predicting Child Positive Reciprocity



MLM Data Preparation

The proportion of variance present at each level of analysis, or the intra-class correlation (ICC), was calculated using an unconditional growth model which included a variable for time. The total variance estimate of the model examining parents' reports of child socialization domain scores (parent reports) was 14.93, with Level 1 accounting for 44.47% of this variance, and Level 2 accounting for 55.53% of this variance. The total variance estimate of the model examining teachers' reports of child socialization domain scores (teacher reports) was 16.89, with Level 1 accounting for 73.42% of this variance, and Level 2 accounting for 26.58% of this variance. Thus, there was an appropriate level of between individual variance at Level 2, which contained the main predictor variables of interest, for both the parent-report and teacher-report models to conduct MLM analyses with this sample.

MLM Time-Only Models

This model considered only the intercept and time as both fixed (i.e. average across the sample) and random (i.e. allowed to vary between individuals) effects. Several possible Level 1 covariance structures were investigated. The diagonal (DIAG) covariance structure was the only Level 1 covariance structure to allow all models to converge, and thus provided the best fit to the data. The Level 2 covariance structure was left unstructured (UN) as this was the most complex covariance structure to allow all models to converge and permit for the most information to be examined, including the random intercept effect, random slope effect, and an unstandardized estimate of the correlation between the intercept and slope.

For the Time-Only model predicting parents' reports of child socialization domain scores, the intercept was 18.08 ($p<.001$), which is the average parent-reported socialization domain score for the sample at Time 1, and the estimate for time was 1.50 ($p<.001$), which is the average increase in parent-reported socialization domain scores across the period of the study (from Time 1 to Time 3). Thus, on average, children showed an increase in their parent-reported socialization domain scores across time, which was consistent with Hypothesis 3. Furthermore, the covariance parameters of the Time-Only model suggested that there was significant variability in the intercept (Wald $Z = 5.00$, $p<.001$) and in the slope (Wald $Z = 1.89$, $p<.05$) to justify examining between-child (Level 2) predictors of differences in children's

intercepts and slopes. Additionally, there was a significant negative correlation between the intercept and slope (-7.02, $p<.05$), which indicated that children who had lower initial scores on the socialization domain had greater increases in their scores across time.

The Time-Only model predicting teachers' reports of child socialization domain scores had an intercept of 18.46 ($p<.001$), which is the average teacher-reported socialization domain score for the sample at Time 1, and the estimate for time was 1.27 ($p<.05$), which is the average increase in teacher-reported socialization domain scores across the period of the study. Thus, on average, children showed an increase in their teacher-reported socialization domain scores across time, which again was consistent with Hypothesis 3. Moreover, the covariance parameters of this model suggested that there was significant variability in the intercept (Wald Z = 3.36, $p<.01$) and in the slope (Wald Z = 1.78, $p<.05$) to justify examining between-child (Level 2) predictors of differences in children's intercepts and slopes. Similar to the parent-report model, there was a significant negative correlation between the intercept and slope (-12.61, $p<.05$), which indicated that children who had lower initial scores on the socialization domain had greater increases in their scores across time.

MLM Full Models

Level 2 between-child predictors were added to the models predicting intercept and slope as fixed effects to examine the remaining hypotheses. A total of four full models with Level 2 predictors were constructed: two parent-report models, one with mother predictors and one with father predictors, and likewise two teacher-report models, one with mother predictors and one with father predictors. First, child age, gender, and disability level were added as Level 2 predictors in order to control for these demographic characteristics and examine their relationship to children's initial status and slope. Next, mothers' and fathers' positive reciprocity scores, mothers' and fathers' frequency scores for directives, and children's positive reciprocity scores toward their mothers and fathers were entered into the appropriate models. Finally, interaction terms between child age, gender, disability level, and the main variables of interest were added into the models as fixed effects for explaining both the intercept and slope. An individual interaction term was only retained if a) the effect was significant at the level of $p<.05$ and b) the addition of the term led to a significant reduction in the model's deviance (-2 Log Likelihood),

indicated by a reduction greater than the chi-square critical value of 3.84. Below, the results for each of the four models are described.

Mother Variables Predicting Parent Reports

The results of the full model examining the parents' reports of socialization domain scores using mother behavioral predictors are displayed in Table 5. This model was used to analyze Hypothesis 2 and 4, that mothers' higher positive reciprocity scores, mothers' lower frequencies of directives, and children's higher positive reciprocity scores would predict higher parent-reported initial socialization scores (Hypothesis 2) and larger positive rates of change in these socialization scores (Hypothesis 4). All main variables of interest and one significant interaction effect were retained in the model. The intercept for the full model was 17.95 ($p<.001$). The only significant predictor of initial socialization domain scores was age at Time 1, such that older children at Time 1 had higher socialization scores. Specifically, initial socialization scores were .02 points higher for every month older children were than the average age ($p<.05$). However, none of the main behavioral variables of interest predicted the intercept, contradicting Hypothesis 2. Also, there were no significant interactions predicting the intercept.

The average slope for the full model was 2.27 ($p<.01$). There were no variables that significantly predicted the slope, which contradicts Hypothesis 4. However, there was a significant interaction between disability level and child positive reciprocity on the slope. This interaction is displayed in figures 4 and 5. Using child disability level as the moderator, Figure 4 shows that for children with mild ID, the level of positive reciprocity scores has little impact on the slope, with similar slopes for children with high, medium, and low reciprocity scores. However, for children with moderate ID, Figure 5 shows that high levels of positive reciprocity toward their mothers were associated with the greatest slopes, indicating positive change in their socialization scores across time. Thus, this pattern of findings lends some support to Hypothesis 4 regarding the positive effect of children's positive reciprocity towards mothers on socialization score growth, but only for children with moderate ID. The most striking difference in slopes occurs for children who showed high levels of positive reciprocity, where the growth is most pronounced for children with moderate ID as compared to children with mild ID. Of note, the children with moderate ID and high positive reciprocity scores also had the lowest initial socialization scores.

The deviance value for the final full Level 2 model (-2 Log Likelihood = 1837.09) was less than the Time-Only model (-2 Log Likelihood = 1991.62), with the deviance difference of 154.53 being greater than the chi-square critical value of 23.65. Thus, although few predictors were significant, the full model was better at predicting initial status and slope of socialization domain scores than the Time-Only model.

Table 5. Multilevel Models with Mother Variables Predicting Parent Socialization Scores (N=156)

		Time-Only Model	Full Model
Predicting Intercept	Intercept	18.08** (SE = .31)	17.95** (SE = 0.67)
	Age (Months)		0.02* (SE = 0.01)
	Disability Level		0.72 (SE = 0.68)
	Gender		-0.75 (SE = 0.63)
	Mother Positive Reciprocity (Pos. Rec.)		0.26 (SE = 0.22)
	Mother Directives		-0.02 (SE = 0.08)
	Child Pos. Rec.		-0.27 (SE = 0.50)
	Disability Level * Child Pos. Rec.		0.59 (SE = 0.57)
Predicting Rate of Change	Time (Linear)	1.50** (SE = .32)	2.27** (SE = 0.68)
	Age * Time		-0.02 (SE = 0.01)
	Disability Level * Time		-1.01 (SE = 0.70)
	Gender * Time		-0.09 (SE = 0.66)
	Mother Pos. Rec. * Time		-0.06 (SE = 0.23)
	Mother Directives * Time		-0.11 (SE = 0.09)
	Child Pos. Rec. * Time		0.67 (SE = 0.52)
	Disability Level * Child Pos. Rec. * Time		-1.14* (SE = 0.58)
Variance Components	Level 1 Residual Time 1	2.32	1.91
	Level 1 Residual Time 2	7.29**	6.58**
	Level 1 Residual Time 3	2.03	3.25
	Level 2 Intercept	13.67**	12.34**
	Level 2 Slope	8.38*	6.00
	Intercept-Slope Correlation	-7.02*	-5.94*
Goodness of fit	Deviance	1991.62	1837.09
	No of estimated parameters	8	22
	AIC	2007.62	1881.09
	BIC	2039.16	1966.53

Notes. (1) SE = Standard Error. (2) *p<0.05; ** p < 0.01

Figure 4. Child Positive Reciprocity (Towards Mothers) Predicting Growth in Socialization Scores for Children with Mild ID

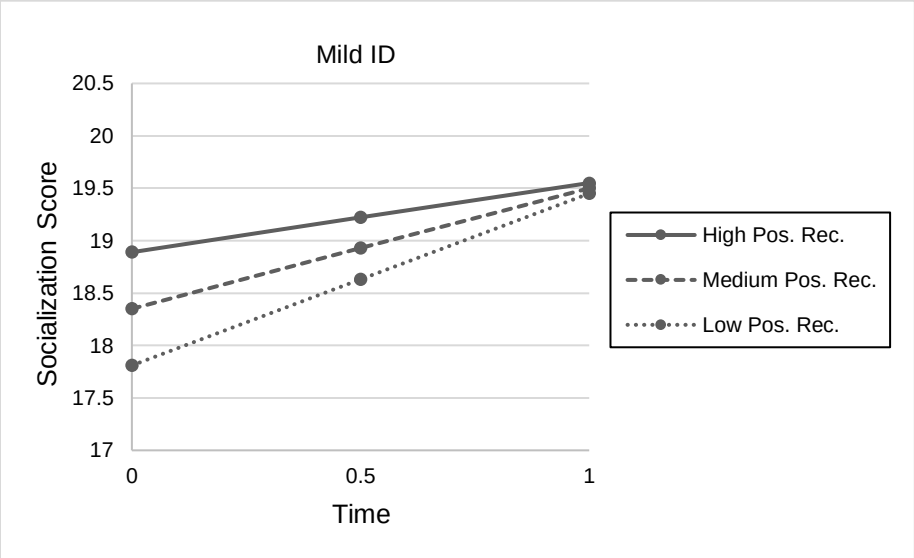
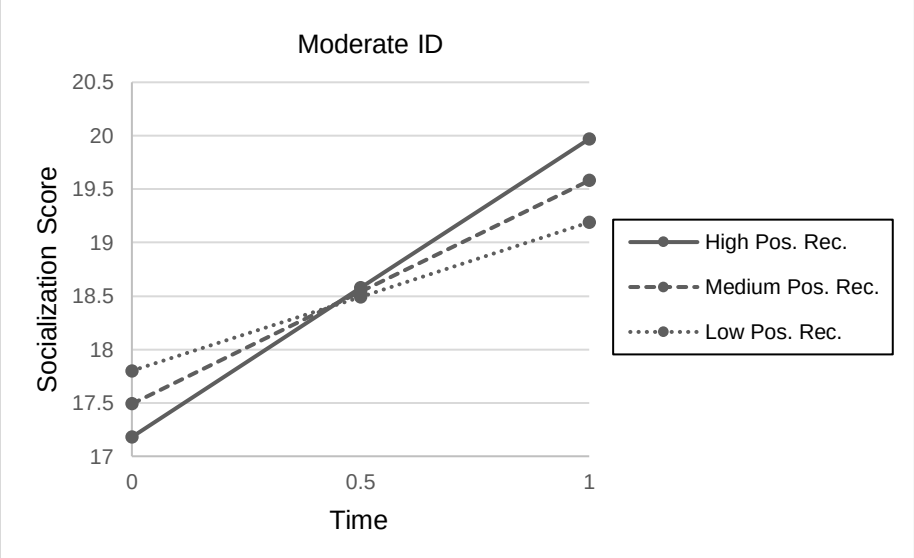


Figure 5. Child Positive Reciprocity (Towards Mothers) Predicting Growth in Socialization Scores for Children with Moderate ID



Father Variables Predicting Parent Reports

The results of the full model examining the parents' reports of socialization domain scores using father behavioral predictors are displayed in Table 6. This model was used to analyze Hypothesis 2 and 4, that fathers' higher positive reciprocity scores, lower frequencies of directives, and children's higher positive reciprocity scores would predict higher parent-reported initial socialization scores (Hypothesis 2) and larger positive rates of change in these socialization scores (Hypothesis 4). All main variables of interest and one significant interaction effect were retained in the model. The intercept for the full model was 18.43 ($p<.001$). The variables that significantly predicted the intercept or initial socialization domain scores were age at Time 1 and fathers' frequency scores for directives. Once again, initial socialization scores were .02 points higher for every month older children were than the average age ($p<.05$). Consistent with Hypothesis 2, the higher fathers' relative frequencies of directives, the lower the children's initial socialization domain scores (-.27, $p<.01$). Furthermore, there was a significant interaction between disability level and fathers' positive reciprocity scores on predicting the intercept. This interaction effect is displayed in Figure 6. Consistent with Hypothesis 2, higher positive reciprocity by fathers was associated with higher socialization scores, though only for the children with mild ID. Furthermore, in contrast to the hypothesis that parent reciprocity would promote greater child socialization, the opposite association occurred for children with moderate ID, where higher positive reciprocity by fathers was associated with lower socialization scores for the children.

The average slope for the full model was 2.42 ($p<.01$), differing only slightly from the slope for the parent reports full model with mother predictors due to the estimate being based on a different subset of families. Child age at Time 1 and disability level significantly predicted children's slope. Children's positive change in socialization scores was .03 points lower for every month they were older than the average child ($p<.05$). Also, children with mild ID as opposed to those with moderate ID showed less growth in socialization scores across time, as indicated by the significant negative effect of disability level on the slope. However, this effect only reached significance once the behavioral variables were added into the model, and not in an intermediary model where demographic variables were examined alone in relation to predicting the intercept and slope, suggesting this effect should be interpreted with caution. None of the main behavioral variables of interest predicted the slope, which contradicts Hypothesis 4.

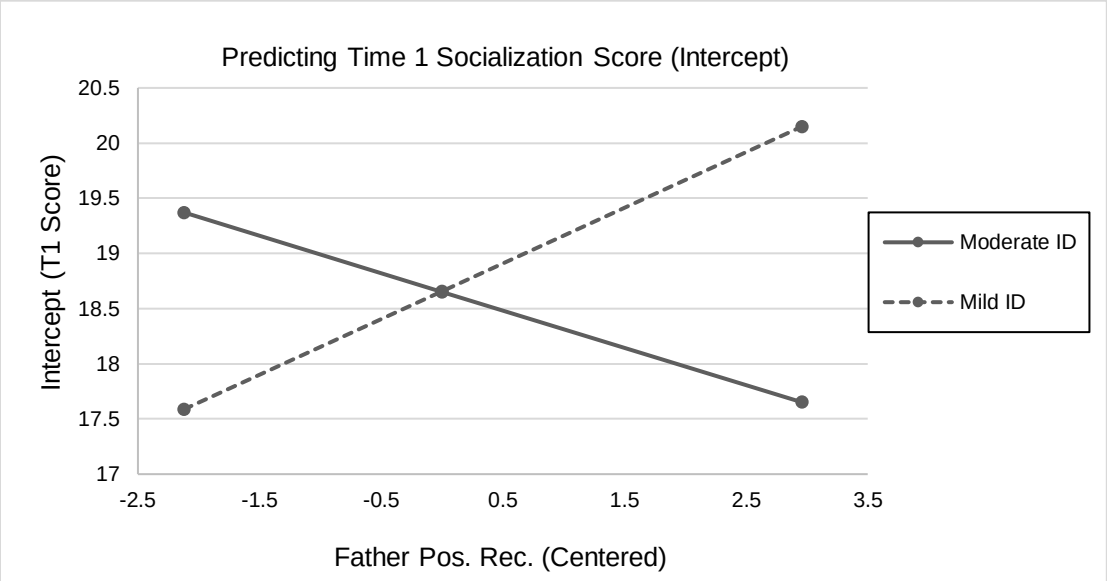
The deviance value for the final full Level 2 model (-2 Log Likelihood = 1128.15) was less than the Time-Only model (-2 Log Likelihood = 1991.62), with the deviance difference of 863.47 being greater than the chi-square critical value of 22.36. Thus, although few predictors were significant, the full model was better at predicting initial status and slope of socialization domain scores than the Time-Only model.

Table 6. Multilevel Models with Father Variables Predicting Parent Socialization Scores (N=96)

		Time-Only Model	Full Model
Predicting Intercept	Intercept	18.08** (SE = .31)	18.43** (SE = 0.75)
	Age (Months)		0.02* (SE = 0.01)
	Disability Level		0.71 (SE = 0.80)
	Gender		-1.29 (SE = 0.73)
	Father Positive Reciprocity (Pos. Rec.)		-0.30 (SE = 0.34)
	Father Directives		-0.27** (SE = 0.10)
	Child Pos. Rec.		-0.35 (SE = 0.29)
	Disability Level * Father Pos. Rec.		1.03* (SE = 0.43)
Predicting Rate of Change	Time (Linear)	1.50** (SE = .32)	2.42** (SE = 0.82)
	Age * Time		-0.03* (SE = 0.01)
	Disability Level * Time		-2.28* (SE = 0.90)
	Gender * Time		0.23 (SE = 0.79)
	Father Pos. Rec. * Time		-0.14 (SE = 0.32)
	Father Directives * Time		-0.06 (SE = 0.11)
	Child Pos. Rec. * Time		0.49 (SE = 0.33)
Variance Components	Level 1 Residual Time 1	2.32	0.35
	Level 1 Residual Time 2	7.29**	7.25**
	Level 1 Residual Time 3	2.03	2.45
	Level 2 Intercept	13.67**	11.77**
	Level 2 Slope	8.38*	8.75*
	Intercept-Slope Correlation	-7.02*	-7.43*
Goodness of fit	Deviance	1991.62	1128.15
	No of estimated parameters	8	21
	AIC	2007.62	1170.15
	BIC	2039.16	1241.79

Notes. (1) SE = Standard Error. (2) *p<0.05; ** p < 0.01

Figure 6. Summary of Interaction Between Disability Level and Father Positive Reciprocity Predicting Initial Socialization Scores



Mother Variables Predicting Teacher Reports

The results of the full model examining the teachers' reports of socialization domain scores using mother behavioral predictors are displayed in Table 7. Once again, this model was used to analyze Hypothesis 2 and 4, that mothers' higher positive reciprocity scores, mothers' lower frequencies of directives, and children's higher positive reciprocity scores would predict higher initial teacher-reported socialization scores (Hypothesis 2) and larger positive rates of change in teacher-reported socialization scores (Hypothesis 4). All main variables of interest and one significant interaction effect were retained in the model. The intercept for the full model was 17.58 ($p<.001$). The variables that significantly predicted the intercept or initial socialization domain scores were child age at Time 1 and disability level. Initial socialization scores were .03 points higher for every month children were older than the average child. Also, children with mild ID had initial socialization scores 1.63 points higher than children with moderate ID ($p<.05$). There were no significant main effects of the behavioral variables and no significant interactions with the child demographic variables; thus, these results do not lend support to Hypothesis 2.

The average slope for the full model was .54 ($p>.10$), which was not significant. However, given that the Time-Only model did indicate a significant positive effect for time and that there were significant effects and interaction terms predicting the slope in the full model, this overall average slope effect should be interpreted within that context. The variables significantly predicting the slope included child age at Time 1 and child gender. Similar to the parent reports models, older children had smaller slopes, such that for every month that children were older than the mean age, their increase in socialization domain scores was .03 points lower ($p<.05$). Also, girls had significantly greater growth in socialization scores across time than boys (2.19, $p<.05$). Again, there were no significant main effects of the behavioral variables on slope. Therefore, these results failed to support Hypothesis 4. However, there was a significant interaction between child gender and mothers' positive reciprocity scores on predicting the slope. This interaction effect is displayed in Figures 7 and 8. Using child gender as the moderator, Figure 7 shows that for boys, high levels of mother positive reciprocity had either little impact on their growth or a somewhat negative impact. However, for girls, Figure 8 shows that mothers' higher positive reciprocity scores predicted greater increases in socialization domain scores across time. This finding lends some support for part of Hypothesis 4, that mothers' positive reciprocity would predict greater growth in child

socialization over the 5-year period, though only for girls. The effect of mother positive reciprocity on the slope for boys and girls is most disparate at high levels of mother positive reciprocity.

The deviance value for the final Level 2 model (-2 Log Likelihood = 1544.77) was less than the Time-Only model (-2 Log Likelihood = 1697.36), with the deviance difference of 152.59 being greater than the chi-square critical value of 23.65. Thus, although few predictors were significant, the full model was better at predicting initial status and slope of socialization domain scores than the Time-Only model.

Father Variables Predicting Teacher Reports

The final model examined father behavioral variables predicting teacher-rated socialization domain scores. However, although a variety of covariance structures were attempted to allow the model to successfully produce a solution, this model would not converge. This was likely due to the lower number of fathers in the sample as compared to mothers in addition to the lower number of teacher-reported socialization domain outcome measurements as compared to parent-reported measurements. Given these limitations and that the model including mother variables predicting the teacher-rated outcome was quite similar to the parent-report models, the teacher-report model including father variables was not examined.

Table 7. Multilevel Models with Mother Variables Predicting Teacher Socialization Scores (N=143)

		Time-Only Model	Full Model
Predicting Intercept	Intercept	18.46** (SE = .36)	17.58** (SE = 0.66)
	Age (Months)		0.03** (SE = 0.01)
	Disability Level		1.63* (SE = 0.69)
	Gender		-0.09 (SE = 0.64)
	Mother Positive Reciprocity (Pos. Rec.)		-0.09 (SE = 0.33)
	Mother Directives		-0.07 (SE = 0.09)
	Child Positive Reciprocity		0.28 (SE = 0.30)
	Gender * Mother Pos. Rec.		-0.64 (SE = 0.47)
Predicting Rate of Change	Time (Linear)	1.27* (SE = .55)	0.54 (SE = 1.04)
	Age * Time		-0.03* (SE = 0.01)
	Disability Level * Time		-1.05 (SE = 1.10)
	Gender * Time		2.19* (SE = 1.02)
	Mother Pos. Rec. * Time		-0.59 (SE = 0.57)
	Mother Directives * Time		0.11 (SE = 0.14)
	Child Pos. Rec. * Time		-0.49 (SE = 0.49)
	Gender * Mother Pos. Rec. * Time		1.71* (SE = 0.75)
Variance Components	Level 1 Residual Time 1	5.57	2.35
	Level 1 Residual Time 2	8.66**	9.33**
	Level 1 Residual Time 3	10.61**	10.75**
	Level 2 Intercept	13.71**	10.78**
	Level 2 Slope	15.67*	11.46*
	Intercept-Slope Correlation	-12.61*	-9.93*
Goodness of fit	Deviance	1697.36	1544.77
	No of estimated parameters	8	22
	AIC	1713.84	1588.77
	BIC	1743.12	1669.43

Notes. (1) SE = Standard Error. (2) *p<0.05; ** p < 0.01

Figure 7. Mother Positive Reciprocity Predicting Growth in Socialization Scores for Boys

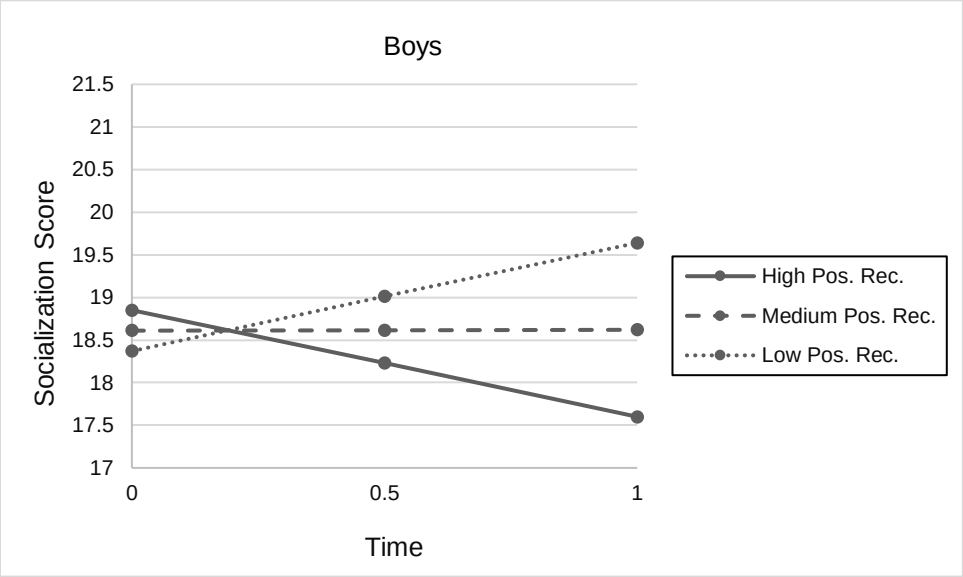
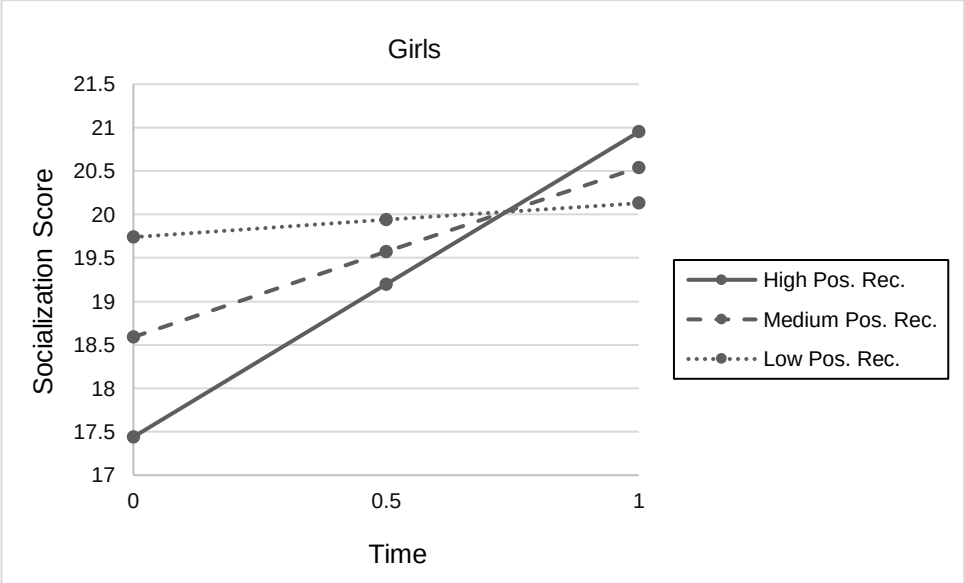


Figure 8. Mother Positive Reciprocity Predicting Growth in Socialization Scores for Girls



Discussion

The results lend some support to the hypotheses that both parents' positive reciprocity and frequencies of directives, representing aspects of their horizontal and vertical behaviors, would be associated with children's social competence. Notably, consistent with Hypothesis 1, there was strong support for the predicted concurrent relationships in observed interactions between the children and parents, where the parents' directives and their positive reciprocity were associated with the children's competent social behavior in the form of positive reciprocity toward the parents. However, there was less support for Hypothesis 2 because there were relatively few significant concurrent relationships between the behavioral measures and children's broader social competence. Also, consistent with Hypothesis 3, the children showed significant growth in social competence over time as reported both by parents and teachers. Yet, there was limited support for Hypothesis 4 because the parent and child behaviors at Time 1 showed only limited associations with growth in social competence over time. Nevertheless, father's directives were significantly negatively associated with concurrent broader social competence, as expected, and some hypothesized associations between parents' behaviors and social competence were found within subgroups of children based on sex and level of disability. Thus, although the significant associations were sparse, the findings that did emerge were coherent and in the predicted directions, with high levels of horizontal behavior and low levels of vertical behavior predicting higher concurrent and longitudinal social competence.

Regarding Hypothesis 1, which proposed significant associations between children's and parents' interaction behaviors at Time 1, the findings that parents' high positive reciprocity and low frequency of directives were associated with children's own greater positive reciprocity are consistent with other research showing that parents' greater use of horizontal behaviors and fewer vertical behaviors predict more socially skilled behaviors by children with and without intellectual disabilities (Guralnick, Neville, Connor, & Hammond, 2003; Lindsey, Mize, & Pettit, 1997). Indeed, a recent meta-analysis of parents' interactions with typically developing children shows a consistent positive relationship between autonomy supportive parenting practices and various indicators of children's adaptive functioning (Vasquez, Patall, Fong, Corrigan, & Pine, 2016). Accordingly, theorists have proposed that parents who permit children autonomy by behaving in a horizontal manner allow them the opportunity to practice their own competent

social behaviors in parent-child interactions (Lindsey, Mize, & Pettit, 1997; Russell et al., 1998). The present behavioral interaction data are entirely consistent with this formulation. Furthermore, they agree with Guralnick et al.'s (2003) speculation that this process occurs not only for typically developing children but also for children with intellectual disability.

Whereas Guralnick and colleagues (2003; 2007a; 2007b) examined the relationship between parents' horizontal behaviors and children's social development among very young children with developmental disabilities, the results of the present study suggest that horizontal parent-child interactions may also be important for the development of socially competent behavior in older children and adolescents with intellectual disabilities. Importantly, research with typically developing children has shown that parents' autonomy supportive behaviors are more strongly related to positive outcomes among middle school and high school aged children than younger children (Vasquez et al., 2016). The present finding in which fathers' relative frequencies of directives predicted less positive reciprocity only for older children is consistent with this age difference. That is, parents' avoidance of highly directive behaviors may be especially important as children with intellectual disabilities grow older, similar to typically developing children, potentially because older children spend more time in interactions unmanaged by parents and, thus, autonomy becomes a more important aspect of their lives (Rubin et al., 1998; McNally et al., 1991).

However, given the cross-sectional nature of the regression analyses at Time 1, a reverse direction of effects is possible. That is, it is possible that the parents' behavior did not elicit children's socially competent behavior, but rather that children's behaviors elicited parents' horizontal and vertical behaviors. Guralnick and colleagues argued that parents' horizontal behaviors might not be parent-driven, but instead are child-driven and prompted by the children's own competent behaviors, such as when children's competent initiation of requests elicits compliance by their mothers (Guralnick et al., 2007a). Likewise, in the present study, children's own high positive reciprocity toward their parents might have elicited their parents to behave in turn by displaying their own high positive reciprocity. Additionally, parents' might tend to use more vertical and power-assertive strategies with children who they perceive as needing more guidance and direction (Guralnick et al., 2003). Therefore, the negative association between parents' directives and children's socially competent behaviors in the present study might have

emerged not because parents' directives inhibit children's social development, but because children with low levels of adaptive functioning elicit parents' greater use of directives. Research will need to continue to investigate the association between parents' horizontal and vertical behaviors and children's social skills in more nuanced and longitudinal designs in order to disentangle their relationships.

In contrast to the consistent support for Hypothesis 1, and despite expect growth in child social competence over time as proposed by Hypothesis 3, Hypothesis 2 and 4 were not consistently supported. That is, the parents' positive reciprocity and directives at Time 1 and children's socially competent behaviors with their parents were only occasionally significantly associated with concurrent and longitudinal measures of children's broader social competence as measured by their socialization domain scores. The scarcity of significant associations between the Time 1 behavioral predictors and the broader social competence measure might be due to several factors. First, the predictors were very specific behavioral variables in the context of family interactions at a single time point, but the criterion, children's socialization domain scores, was a much broader measure of general social ability. The socialization domain includes items related to a wide range of social skills, such as being aware of information about others and social maturity (i.e. "Is too familiar with strangers"), not all of which would be expected to relate to the ability to interact reciprocally with others. Further research might use social competence measures that are more closely related to the aspects of social behavior that parents' horizontal behaviors are theorized to facilitate, such as interpersonal reciprocity or the ability to successfully initiate and maintain peer interactions. Additionally, the current study examined how specific observed behaviors in one setting generalized to a global measure of socially adaptive behavior, with no intermediate variable between. Future research might consider involving a more proximal criterion variable, such as children's competent behavioral interactions with peers (Guralnick et al., 2007a). Furthermore, the limited parenting behaviors examined here (i.e. positive reciprocity and relative frequency of directives) also do not capture the full range of horizontal and vertical parenting behaviors or the multiple ways that parents can promote children's social competence, such as arranging their involvement in peer-related activities. Thus, future studies should use not only more intermediate measures of social competence but also account for a wider variety of ways parents influence their children's development of social skills.

Although the significant associations between the Time 1 behavioral variables and the children's broad social competence were sparse and limited to specific subgroups, they were consistently in the hypothesized directions proposed in Hypotheses 2 and 4. That is, parents' greater positive reciprocity, parents' lower frequencies of directives behaviors, and children's greater positive reciprocity with parents were positively related to children's broad social competence both concurrently and over time. For example, highly directive fathers had children with poorer concurrent social skills for the sample as a whole, whereas fathers who behaved horizontally (i.e. high levels of positive reciprocity) had children with greater social competence, though only for children with mild ID. These findings support Hypothesis 2 that parents' higher positive reciprocity and lower frequencies of directives at Time 1 would be associated with higher concurrent socialization domain scores. Additionally, though only in the case of children with moderate ID, children who behaved competently in interactions with their mothers as demonstrated by their higher levels of positive reciprocity displayed greater growth in social competence. Moreover, mothers' who interacted horizontally by displaying greater levels of positive reciprocity had children who showed greater growth in social skills, although only for girls. These findings regarding growth in social competence support Hypothesis 4 in that parents' and children's higher positive reciprocity predicted greater positive rates of change in socialization scores, albeit within specific subgroups. Though the limited findings should be interpreted with caution, future research might attempt to examine these associations in larger samples and with more powerful designs.

Apart from the hypothesized findings, the results revealed differences between findings for fathers' and mothers' behaviors that suggest possible differences in roles and impacts for the two parents. Notably, fathers' directives were the only significant behavioral predictor of children's concurrent broad social competence for the sample as a whole, whereas no associations occurred for the mothers' directives. On the one hand, perhaps fathers' directives are particularly impactful for children because they occur less often than directives by the mothers and, thus, might be perceived as especially punitive or controlling by the children. Alternatively, there is some evidence that fathers' behavior often tends to be in response to children's level of functioning, whereas mothers' behavior tends to direct children's skill development and be less reactive to what skills children are presenting (Fenning et al., 2014; Floyd & Olsen, 2017). Accordingly, it is possible that fathers' greater use of directives is associated with children's

lower social competence due to fathers interacting in a more vertical manner with children with intellectual disabilities who are presenting as less socially skilled and thus in need of greater direction. The lack of significant longitudinal associations between fathers' directives and children's social competence also suggests that the significant concurrent association between father's directives and children's social competence may be driven by children's behavior, and high frequencies of directives reflect fathers merely reacting to children's low level of competence at the time of measurement. Future research should examine how mothers' and fathers' various vertical behaviors predict multiple aspects of children's functioning over time, and should further assess whether fathers' directive behaviors are particularly limiting children's opportunities to develop social skills or are predominantly in reaction to children's behaviors.

Interestingly, the findings also suggest that mothers' and fathers' behaviors might influence boys' and girls' social development in different ways, as several associations occurred only for gender-matched parents and children. Specifically, regarding the Time 1 regression analyses, fathers' positive reciprocity was much more strongly related to boys' than girls' positive reciprocity, and mothers' directives was a stronger predictor of girls' than boys' positive reciprocity. Longitudinally, the finding in which mothers' positive reciprocity predicted greater growth in children's social competence over time only for girls is also consistent with a gender-matched pattern. Very limited research has attempted to examine how mothers' and fathers' behaviors with their children with intellectual disabilities may differ depending on the gender of the child. It might be that parents attend more closely to same-gender children and thus more effectively communicate social skills to these children. The finding that mothers and fathers tended to display more positive reciprocity at Time 1 toward their same-gender children is consistent with this notion. Alternatively, research with typically developing children suggests that differences in mothers' and fathers' parental roles and methods of socializing with children might most efficiently promote social development for gender-matched children (Pettit et al., 1998). For example, Pettit and colleagues (1998) found that mothers' social coaching behaviors were the strongest predictor of girls' social competence whereas fathers' dyadic play was the greatest predictor of boys' social competence among 3- to 6-year-old children. Perhaps expectations about socially competent behaviors might differ depending on the gender of the child, and same-gender parents might more effectively promote gender-specific socially

competent behaviors with boys and girls through the types of socialization strategies they use (e.g., mother use of verbal social coaching with girls, fathers' use of play behavior with boys; Pettit et al., 1998). This model of parents' gendered socialization strategies might apply not only to typically developing children, but also to children with intellectual disabilities. However, even among samples of typically developing children, there have been many inconsistent patterns of findings regarding the interaction between parent and child gender on children's adaptive outcomes, perhaps in part due to small sample sizes (Pettit et al., 1998). The few patterns of gender-matched associations in the current study will need replication to draw conclusions about the interaction between parent and child gender, particularly within populations of children with intellectual disabilities.

Also, different relationships emerged between the behavioral predictors and children's social competence depending on the children's level of disability. Specifically, father positive reciprocity predicted concurrent social competence for children with mild ID but not children with moderate ID. This perhaps suggests that a certain level of cognitive functioning (i.e. mild as opposed to moderate ID) might be necessary for children to abstract from experiences with parents and apply these skills to interactions with peers. At the same time, children's own positive reciprocity towards mothers predicted greater growth in social competence for children with moderate ID only. This outcome might be in part due to children with moderate ID starting off with relatively, though not significantly, lower social competence (see Figures 4 and 5) and thus having greater opportunity for growth. There is also some evidence that a major coping mechanism for parents with children with disabilities is the development of an explanatory model of their children's difficulties that explains their problematic behaviors in relation to their disability status and low cognitive functioning, instead of a lack of motivation or effort by the child (Fenning, Baker, Baker, and Crnic, 2007; Baker, Blacher, Kopp, & Kraemer, 1997). Perhaps parents of children with only mild ID are not able to benefit as much from this coping strategy as their children's challenges appear less consistent, and thus are less consistently recognized as stemming from the disability. These parents might develop higher expectations for their children's behavior and not be as sensitive to rating growth in their social skills. However, if parents are perceiving the behavior of children with mild ID more negatively than children with moderate ID, it is not clear why fathers' positive reciprocity predicted greater concurrent social competence only for children with mild ID as described above. Thus, these various explanations for

the results regarding disability level are not consistent across the set of findings. Importantly, the current study had limited power to explore differences between children with mild and moderate ID interacting with their mothers and their fathers. The occurrence of these subgroup effects, though, suggests that it might be valuable to investigate how children's disability level influences the relationship between parenting behavior for mothers and fathers and children's development of socially adaptive behavior in larger scale studies.

The findings were also discrepant for the parent report and the teacher report measures. Parent and teacher reports of social competence were not consistent with each other, and some significant relationships were found between the behavioral predictors and parent reports of socialization domain scores, but entirely different relationships were found with the teacher reports. Discrepancies between different informants' reports of children's psychological outcomes are well documented (De Los Reyes & Kazdin, 2005). It might be that parent and teacher reports of social competence are capturing different aspects of the larger construct. Parents necessarily view their child's behavior in the contexts in which they interact with their child, whereas teachers view children's behaviors in the school setting, which parents have less direct access to observe. The social behaviors that children display and use across settings likely vary, and might represent distinct aspects of social competence (Achenbach, McConaughy, Howell, 1987; Achenbach, 2006). Additionally, it has been suggested that informants' discrepant reports are the result not only of the environments in which they observe children, but also informants' differing attitudes and memory processes that influence the way informants evaluate children's behavior (De Los Reyes & Kazdin, 2005). For example, informants' descriptions of children's problematic behavior might depend on their understanding of the cause of the behavior (e.g., disability status, willful disobedience). Moreover, parents and teachers might have differing perspectives on which behaviors (e.g., disobedience at home or shyness in class) are the most concerning and therefore the most salient in memory and influential on their reports of children's functioning. Thus, parents and teachers are likely to have differing schemas of children's behaviors given their different contexts and roles. Therefore, it is not surprising that parent and teacher reports of social competence were associated with divergent predictor variables. A fruitful goal for future research might be to establish a better understanding of parent-teacher reporting discrepancies.

There were many limitations to the current study's methods and design that should be improved in future investigations. Family members' behaviors might have been influenced by the somewhat artificial procedures involved in organizing and videotaping the semi-structured interaction task at Time 1, and therefore their interactions might not have been representative of their everyday functioning. However, there is some evidence that reactivity effects for family observations are minimal, especially when family interactions occur within the home, as was the case in the present study (Gardner, 2000; Jacob, Tennenbaum, Seilhamer, Bargiel, & Sharon, 1994). Additionally, the sample in the present study was relatively small, especially considering that many analyses partitioned the participants into demographic subgroups (i.e. child gender and child disability level, mothers and fathers). Also, there were notably fewer fathers than mothers, notably fewer teacher reports of social competence than parent reports, and less data in general for participants at later measurement points. The reduced samples due to these subdivisions might have limited the power of the analyses to identify meaningful relationships between the variables of interest. Also, there was only one parent report of child social competence for each parental dyad, instead of a separate measure for mothers' and fathers' reports, which prohibited comparisons of mothers' and fathers' perspectives. Furthermore, horizontal and vertical parenting in the current study were examined using only two examples of these types of parenting techniques, parents' positive reciprocity and relative frequencies of directives. These variables do not fully capture the range of parenting behaviors that might be considered either horizontal or vertical, and are only two specific and limited manifestations of this construct. Moreover, it might be possible that horizontal and vertical parenting behaviors interact together (e.g., high horizontal-low vertical, high horizontal-high vertical, low horizontal-low vertical) to influence children's social growth, and these interacting dimensions of parenting styles were not examined in the present study. Future research should continue to expand on the current study and examine how differing aspects of horizontal and vertical parenting work together to influence social development in children with intellectual disabilities.

Overall, the present study lends support to the hypotheses that parents' greater horizontal behaviors and fewer vertical behaviors with children with intellectual disabilities are positively related to children's socially adaptive behaviors. The present study examined only one manifestation of horizontal and vertical parenting, but found support for their predicted influence on the development of social

competence in this population. Parents' own greater use of positive reciprocity and fewer directives in interactions with their children with intellectual disabilities predicted children's greater socially competent behavior with parents, which confirms the findings of other researchers. Moreover, although the findings were sparse and limited to specific subgroups, parents' positive reciprocity and children's own positive reciprocity with parents were positively related to children's broader social competence, both concurrently and over time. The current examination lays groundwork for further investigations into how parents' behaviors can support the development of social skills in children with intellectual disabilities. Although there are many limitations to the current study, the findings offer evidence supporting Guralnick's (1999a) argument: social skills for children with intellectual disability might be effectively developed and bolstered within the family environment. Perhaps an intervention approach focusing on increasing parents' horizontal behaviors and decreasing their vertical behaviors with children with intellectual disabilities would be an effective avenue to address social skill deficits and promote adaptive outcomes in this population.

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